

REMARKS/ARGUMENTS

Reconsideration and withdrawal of the rejection is requested, as is the passage of this case to Issue.

The present invention relates to a process for regenerating a spent hydrogenation catalyst that has been used in the hydrogenation reaction of acetylene present in a gas mixture consisting essentially of HCl obtained from the pyrolysis of 1,2-dichloroethane.¹ The catalyst comprises at least one catalytic metal selected from the group consisting of Ru, Rh, Pd, Os, Ir and Pt on an inert support, and the process for regenerating it consists essentially of thermally treating this very specific, and very specifically deactivated, spent hydrogenation catalyst in the presence of oxygen at a temperature of between 300 and 700 °C. See Claim 10 herein.

In making the present rejection the Examiner has added a translation of Vollheim (DE 24 38 153), and combined it with Welty (U.S. 2,368,507). One critical issue herein is what one of ordinary skill in the art would have understood about the regenerability of the catalysts disclosed in DE ‘153. Another is what he would have done given this understanding.

DE ‘153 was authored by Degussa,² the supplier of the catalyst Applicant used in the example appearing in the present specification at page 5, lines 10ff. In the translation of DE ‘153 it is broadly stated that regeneration of the spent catalyst is “economically worthwhile,” “technically light” and “possible.” No detail or suggestion is given regarding *how* to regenerate the catalyst.

In trying to figure out just how to actually accomplish this “economically worthwhile,” “technically light” and “possible” regeneration Applicants found no solace (or

¹ As explained at specification page 1, in the production of vinyl chloride 1,2-dichloroethane is subjected to pyrolysis to form vinyl chloride and HCl. In the course of this pyrolysis a small amount of acetylene is also produced, which is not easily separated from the HCl due to their similar volatilities. Therefore, instead of separating the acetylene from the HCl it is removed by hydrogenating the acetylene/HCl mixture it in the presence of a catalyst, converting the acetylene into ethylene. Over time the catalyst undergoes deactivation, and it is this catalyst that is regenerated in the present invention.

² In this regard, Degussa is not merely the “patent holder” of DE ‘153.

useful information) in the platitudes appearing in DE ‘153, and turned to the author (and supplier) for direction. In response, they received a letter from Degussa informing them that “no catalyst regeneration [is] possible,” recommending instead replacement with fresh catalyst.

However, after much research, and contrary to the indication by the supplier, Applicant has found, surprisingly, that the regeneration of the particularly claimed spent hydrogenation catalysts herein can be accomplished relatively easily by thermal treatment in the presence of oxygen at a temperature of between 300 and 700 °C. This finding is completely surprising and unexpected in view of the clear belief to the contrary of those skilled in the art, especially in view of the secondary objective evidence of record herein documenting the failure of others to regenerate such catalysts. As recently stated by the Federal Circuit in *Bayer Schering Pharma AG v. Barr Laboratories Inc.*, 91 USPQ2d 1569 (Fed. Cir. 2009) “[a]n obviousness analysis is based on several factual inquiries. A court must examine the scope and content of the prior art, the differences between the prior art and the claims at issue, and the level of ordinary skill in the pertinent art. At that point, a court may consider secondary objective evidence of non-obviousness, such as commercial success, long felt but unsolved need, failure of others and the like.”³ Applicant has provided such secondary objective evidence of the failure of others sufficient to support patentability herein. See the Declaration of Michel Strebelle, filed March 9, 2009.

The fact that Welty discloses that thermal treatment has been used to regenerate other types of spent catalysts does not affect the patentability of the present invention, or lessen the importance of Applicant’s secondary objective evidence of the failure of others. Moreover, the Examiner commits reversible error in taking the position that because Welty describes the

³ *Bayer Schering Pharma AG* 91 USPQ2d at 1572 (emphasis added, citations omitted).

regeneration of a different catalyst it would have been obvious to try Welty's regeneration conditions to regenerate the catalyst of DE '153.⁴

In *KSR*, the Supreme Court indicated that that an invention *may* be obvious *if* 1) it would have been obvious to a person having ordinary skill to try a course of conduct to solve a problem *and* 2) there are a finite number of identified, predictable solutions.⁵ The Federal Circuit, in *In re O'Farrell*, 853 F.2d 894, 7 USPQ2d 1673 (Fed. Cir. 1988), recognized that most inventions that are obvious were also obvious to try, but found two classes where that rule of thumb did not obtain:

First, an invention would not have been obvious to try when the inventor would have had to try all possibilities in a field unreduced by direction of the prior art. When "what would have been 'obvious to try' would have been to vary all parameters or try each of numerous possible choices until one possibly arrived at a successful result, where the prior art gave either no indication of which parameters were critical or no direction as to which of many possible choices is likely to be successful" an invention would not have been obvious. *O'Farrell*, 853 F.2d at 903. This is another way to express the *KSR* prong requiring the field of search to be among a "finite number of identified" solutions. 550 U.S. at 421.

Second, an invention is not obvious to try where vague prior art does not guide an inventor toward a particular solution. A finding of obviousness would not obtain where "what was 'obvious to try' was to explore a new technology or general approach that seemed to be a promising field of experimentation, where the prior art gave only general guidance as to the particular form of the claimed invention or how to achieve it." *O'Farrell*, 853 F.2d at 903. This expresses the same idea as the *KSR* requirement that the identified solutions be "predictable." 550 U.S. at 421.

Bayer Schering Pharma AG 91 USPQ2d at 1573 (citations omitted).

In the present case, DE '153 in no way limits the parameters or the numerous possible choices one of ordinary skill in the art faces in attempting to regenerate a catalyst. In addition,

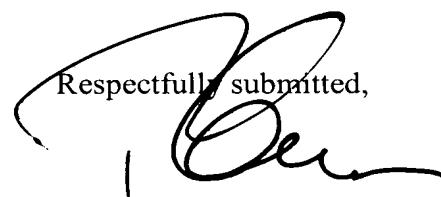
⁴ Welty does not discuss spent hydrogenation catalysts used in a hydrogenation reaction of acetylene present in a gas mixture consisting essentially of HCl obtained from the pyrolysis of 1,2-dichloroethane as claimed herein but, instead, relates to catalysts used in cracking, reforming, dehydrogenation, aromatization, and the like. See col. 1, lines 1-6 of the reference.

⁵ *KSR International Co. v. Teleflex Inc.*, 550 U.S. 398, 421 (2007).

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DE '153 is the "poster child" for references that constitute "vague prior art [that] does not guide an inventor toward a particular solution." That Welty describes one set of conditions for the regeneration of a different catalyst does not change the fact that the disclosure in DE '153, even when taken with Welty, squarely falls within the exceptions noted above given the absolute lack of a finite number of identified, predictable solutions available to one of ordinary skill interested in regenerating a particular catalyst. The fact that the Examiner, through hindsight, was able to find one example of thermal catalyst regeneration for a different catalyst does not change this analysis, which is forward looking and which must take into account all of the possibilities faced by one attempting to regenerate the catalyst of DE '153, considered by those of skill in the art to be nonregenerable.

Accordingly, and in view of the clear teaching in the art regarding the supposed unregenerability of the particular spent hydrogenation catalysts being regenerated here, and the fact that DE '153 in no way limits the number of possible routes to regeneration, Applicant respectfully requests the reconsideration and withdrawal of the outstanding rejection, and the passage of this case to Issue.



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